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CONSUMER ACCEPTANCE STUDIES



SCHOOL OF HOME

ECONOMICS

and

DEPARTMENTS

of

ANIMAL SCIENCE and

AGRICULTURAL ECONOMICS AND

AGRIBUSINESS

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Table of Contents

	Page
Introduction	3
Procedure	4
Characteristics of the Family Panel	5
Consumer Habits of Buying and Using Ground Beef	7
Consumer Evaluation of Ground Beef	11
Influence of Family Characteristics on Average Panel Ratings	12
Summary and Conclusions	13
Appendix	15
Literature Cited	20

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Southern Regional Research Project SM-19

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Consumer Acceptance Studies

II. Ground Beef of Varying Fat Composition

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Introduction



Ground beef is one of the most popular items on the retail market. It accounted for 31 percent of the total pounds of beef purchased during the period of a USDA survey of food consumption (7). Woods and Nettles (8) found ground beef ranked second only to chicken in the number of times it was suggested as the appropriate meat for various meal situations.

Considerable research has been carried out concerning consumer evaluation of specific beef cuts. However, little work has been done with ground beef to determine quality characteristics preferred by consumers. Two recent studies have dealt specifically with the fat content of ground beef. Glover (6) hypothesized that degree of leanness is the basic criterion by which consumers judge quality in ground beef. Using a sample composed of 150 families in each of two cities, he found that ground beef containing 20 percent fat was preferred over 16, 25, and 30 percent fat levels for hamburger-type patties.

Cole, Ramsey, and Odom (4) investigated the effect of fat content on palatability of broiled ground beef. A five-member taste panel and six-member family panel indicated that desirable tenderness and juiciness were best obtained with broiled ground beef patties of at least one-third fat content. The authors suggested that leaner ground beef may be more desirable for other uses, such as meat loaf and sauces, where fat from the ground beef is not drained off as it is in broiling.

The trend toward centralized processing and packaging of ground beef for distribution to retail outlets makes it important to know the fat levels consumers prefer in ground beef. If ground beef of the most acceptable fat level and consistent uniformity is offered, greater consumer satisfaction and subsequent increased sales will benefit all phases of beef marketing.

The present study is based on the following hypotheses:

1. Degree of leanness is the fundamental feature consumers associate with quality in ground beef.
2. The amount of fat that is acceptable to the consumer is influenced by the way the ground beef is prepared. Less fat is acceptable in dishes in which the fat becomes a part of the final product,

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such as spaghetti sauce, than is acceptable in hamburger patties where the fat is drained off.

3. Low income families differ from medium and high income families in the way they evaluate the acceptability of various fat levels in ground beef. High income families tend to be more discriminating.

Procedure

Sampling

The consumer panel, consisting of 122 families in Baton Rouge, Louisiana, was obtained by a random sampling process from addresses appearing in a commercially prepared directory (5). This directory lists all the streets in Baton Rouge, the number of residences on each street, and the house numbers and names of occupants. A running total of the number of residences on all streets was made; then a random number table was used to choose the desired number of streets from which to obtain the required number of families. In this way every section of Baton Rouge had an equal chance to be represented in the sample. The sample size for selected streets was 20 percent of the number of residences on a street, with a maximum sample of ten residences. Addresses of the primary sample were picked by random number, and groups of five alternates were picked in a similar manner. Existence of a family situation was the only requirement for participation.

Interviewing

Homemakers were interviewed by members of the Home Economics Marketing Research staff in the spring of 1964. A detailed questionnaire was used to provide information on such family characteristics as race, size of family, ages of family members, occupations and education of husband and wife, and family income. These were used to study their effect on consumer acceptance of various fat levels in ground beef. Information on buying practices and utilization of ground beef also was obtained.

Conducting the Panel Test

In order to determine the fat levels acceptable for two forms of ground beef, families were asked to buy, at a reduced price, five packages of frozen patties and five packages of frozen bulk ground beef in amounts requested by each family. Each package contained a rating sheet (Appendix A) on which the respondents were asked to rate, according to a 9-point hedonic scale, the following characteristics: *color before cooking*, *shrinkage*, *general cooking qualities*, *juiciness*, *flavor*, and *general acceptability*. Space was available for comments. Ground beef of three different fat levels — 15 percent, 25 percent, and 35 percent — was rated by each family. Randomly selected replicates

of two of the three fat levels were included to make up five packages of patties and five packages of bulk ground beef for each family. Glover's study (6) indicated that cooking methods did not affect results. Therefore, families in the present study were not asked to use any special cooking method, but were to use the patties as hamburgers and to indicate the cooking method used. The bulk form was to be used for any ground beef dish the family desired except as hamburgers.

Obtaining the Desired Fat Composition

Ground beef of varying fat composition was prepared by a commercial meat packer, under the direction of the Animal Science Department, from Utility grade beef chuck, and suet from Good and Choice grade carcasses. The 15 percent fat level was obtained without the addition of trim fat, the 25 percent fat level by the addition of approximately 12 pounds of suet per 100 pounds ground chuck, and the 35 percent fat level by the addition of approximately 21 pounds of suet per 100 pounds of ground chuck. Fat levels were ascertained during the final grinding and mixing operation by a rapid method of fat determination utilizing the Babcock fat testing principle. The fat content was adjusted to within plus or minus 1 percent of the desired levels by this method.

One-half of each formulation was made up into patties — four per pound. The remainder was packaged as bulk ground beef. All the ground beef was wrapped in laminated freezer paper and quick-frozen prior to delivery.

Statistical Analysis

The mean (or average) hedonic ratings for each characteristic and each form and fat level were computed, as well as the analysis of variance, by the IBM 1620 computer. To facilitate the analysis, only those families with complete returns were used (110 families). Where more than one answer for each type was given, one was randomly chosen.

Characteristics of the Family Panel

Size of Families

A consumer panel, consisting of 112 white families and 10 nonwhite families, was selected in Baton Rouge, Louisiana. Families ranged in size from 2 to 10 persons, with an average family size of 4.8 persons. This was slightly larger than the average population per household in Baton Rouge, which in 1960 was 3.43 persons (3).

Income

Three income categories were used in this study — low (under \$5,000), medium (\$5,000 to \$10,000), and high (\$10,000 or more). Twenty-two percent of the families were in the low income group, 53 percent in the medium income group, and 25 percent in the high income

TABLE 1.—Characteristics of the Family Panel

Classification	Number	Percent*	Classification	Number	Percent*
Family Income			Occupation of Husband**		
Less than \$5,000	27	22.1	Professional	53	50.0
\$5,000 to \$10,000	65	53.3	Clerical and Sales	12	10.3
\$10,000 or more	30	24.6	Craftsmen and Operatives	36	31.1
			Service Workers and Laborers	4	3.4
Race			Retired, Unemployed, Welfare	6	5.2
White	112	91.8			
Nonwhite	10	8.2			
Total Number of Persons in Household			Age of Husband**		
Two-Four	62	50.8	20 to 30 years	25	21.6
Five-Seven	53	43.5	30 to 50 years	73	62.9
Eight-Ten	7	5.7	50 years or older	18	15.5
Number of Persons under 6 years					
One	37	30.3	Age of Homemaker		
Two	24	19.7	20 to 30 years	36	29.5
Three	6	4.9	30 to 50 years	68	55.8
Four	3	2.5	50 years or older	18	14.7
None	52	42.6			
Number of Persons 6-11 years			Education of Husband**		
One	29	23.8	Grade School	10	8.6
Two	22	18.0	High School	37	31.9
Three	8	6.5	College	45	38.8
Four	3	2.5	Postgraduate Work	19	16.4
Five	1	0.8	Other: Business or Trade School	5	4.3
None	59	48.4			
Number of Persons 12-19 years			Education of Homemaker		
One	16	13.1	Grade School	6	4.9
Two	18	14.8	High School	49	40.2
Three	9	7.4	College	44	36.0
Four	2	1.6	Postgraduate Work	4	3.3
None	77	63.1	Other: Business or Trade School	18	14.8
			No Formal Education	1	0.8

*Percentages in each classification total 100.

**Based on 116. Six respondents had no husbands.

group (Table 1). This compares with 43 percent, 39 percent, and 18 percent in the low, medium, and high income groups, respectively, for Baton Rouge (1960 census) (3).

Occupations of Husbands

Half of the husbands were classified (2) in the professional, technical, or managerial fields. Another one-third were in the craftsmen, foremen, or operatives group, while clerical and sales workers accounted for one-tenth of the total. Four were service workers or laborers. Six of the husbands were retired or unemployed, and six of the respondents had no husband.

Occupations of Homemakers

The majority of the women were full-time homemakers. This is to be expected since the interviewing took place during the daytime hours. Only 3 percent worked outside the home full-time, and another 12 percent worked part-time. Clerical and sales work were the occupations listed most often by women who had full- or part-time positions.

Age of Respondents

One-fifth of the husbands and one-third of the homemakers were between 20 and 30 years of age. Over half of the homemakers and husbands were between the ages of 30 and 50 years. Fifteen percent of the homemakers and husbands were 50 years of age or older. The average age of this sample was slightly younger than the average of the adult Baton Rouge population (1960 census) (3).

Education of Husbands

East Baton Rouge Parish leads all other parishes in the state in the level of education, with adults having completed a median of 11.9 years of schooling (1). In this study, approximately one-third of the husbands had some high school education or had finished high school, while over half had some college education or were college graduates. Nineteen of these had done some graduate work or had received advanced degrees. Five husbands had received business college or trade school training and ten had only an elementary education.

Education of Homemakers

Two-fifths of the homemakers had received some high school education or had completed high school. A similar number had some college training or had completed college. Eighteen listed business college or trade school as part of their education. Six homemakers had an elementary education while one had no formal education.

Consumer Habits of Buying and Using Ground Beef

Homemakers were asked about their habits and preference for buying and using ground beef to determine their concept of ground beef and the influence this has on the acceptability of various types.

Use of Ground Beef

Ground beef was a popular form of beef in the diets of the families in the study. Eighty-eight percent indicated that they served ground beef in some way two or more times per week. Hamburgers were by far the most common form of ground beef served, with meat balls, meat sauce, and meat loaf following in popularity (Table 2).

TABLE 2.—Method and Frequency of Preparation of Ground Beef by Respondents

Form	Two or more times per week		One time per week		One or two times per mo.		Occasionally		Never	
	No.	%	No.	%	No.	%	No.	%	No.	%
Estimated times										
ground beef served	107	87.7	13	10.7	2	1.6	0	0.0	0	0.0
Hamburgers	41	33.6	54	44.3	25	20.5	1	0.8	1	0.8
Meat loaf	1	0.8	20	16.4	60	49.2	32	26.2	9	7.4
Chili	0	0.0	7	5.7	22	18.0	40	32.8	53	43.4
Meat balls	4	3.3	37	30.3	46	37.7	10	8.2	25	20.5
Ground beef casseroles	0	0.0	5	4.1	31	25.4	29	23.8	56	45.9
Meat sauce	0	0.0	19	15.6	49	40.2	27	22.1	27	22.1
Other dishes	1	0.8	5	4.1	33	27.0	24	19.7	7	5.7

Forms Purchased

Almost half of the respondents stated that they usually purchased ground beef in the pre-packaged, bulk form, while about one-third usually had beef ground to order. Fifteen bought a side or quarter of beef or raised their own beef. Very few ever purchased frozen or fresh ground beef patties (Table 3).

TABLE 3.—Frequency Respondents Purchase Ground Beef in Different Forms

Form	Always		Most of the time		About half the time		Rarely		Never	
	No.	%	No.	%	No.	%	No.	%	No.	%
Not pre-packaged, bulk	7	5.7	6	4.9	6	4.9	19	15.6	84	68.9
Pre-packaged, bulk	36	29.6	22	18.0	16	13.1	21	17.2	27	22.1
Ground to order	17	13.9	16	13.1	12	9.8	18	14.8	59	48.4
Frozen patties	0	0.0	1	0.8	3	2.5	34	27.9	84	68.8
Fresh patties	2	1.6	0	0.0	5	4.1	12	9.8	103	84.5
Side or quarter of beef	15	12.3	0	0.0	0	0.0	0	0.0	107	87.7

Who Purchases Ground Beef and Where

In almost all of the families, the homemaker purchased most of the meat. Over half of the respondents bought ground beef at large national chain stores, while almost one-fifth obtained ground beef from a local meat packer or wholesaler. Retail stores are maintained by many of

these wholesalers. The remainder of the respondents bought at local chain stores, local grocery stores, or meat markets (Table 4).

Product Characteristics

Families were asked to rank selected characteristics they used in purchasing ground beef. The color of the meat was rated most important, with leanness, label, and price following in order of importance. Color was usually thought to be an indication of the amount of fat present. Therefore, leanness appears to be the quality characteristic most desired in ground beef. Price does not appear to be a primary factor, because of the relatively low price of ground beef compared to other beef cuts (Table 5).

Preferences

Most of the ground beef made from available trimmings and retailing below 50 cents per pound is labeled as "ground beef" in the Baton Rouge area. The name "hamburger" is seldom used. Ground chuck and ground round usually are marketed as such.

Homemakers were asked which kind of ground beef they preferred and which they usually bought for two family dishes, hamburgers and meat sauce for spaghetti. This was done to test the hypothesis that ground beef with less fat is preferred for dishes in which the fat becomes a part of the final product, such as meat sauce. Homemakers made little distinction between types of ground beef preferred for the preparation of hamburgers and that preferred for meat sauce, as indicated in Table 6. In comparing preferences with what was actually purchased for the two uses, some differences are evident. Lower prices

TABLE 4.—Where Respondents Usually Purchase Ground Beef

Type store	Number	Percent
National chain	66	54.1
Local chain	7	5.7
Local meat market	4	3.3
Local grocery	9	7.4
Local meat packer or wholesaler	23	18.9
Voluntary chain	11	9.0
Raise own beef	2	1.6

TABLE 5.—Average Rating for Product Characteristics Used in Purchasing Ground Beef

Characteristic	Average rating	Number of respondents rating
Color	1.86	122
Leanness	2.38	122
Label	2.83	118
Price	3.08	120
Other	3.58	19

(Ratings from 1 to 5 were possible, 1 being the highest rating.)

TABLE 6.—Form of Ground Beef Preferred and Bought for Two Uses

Form	Preferred for meat sauce		Bought for meat sauce		Preferred for hamburgers		Bought for hamburgers	
	No.	%	No.	%	No.	%	No.	%
Ground beef or hamburger	26	21.3	48	39.3	28	23.0	49	40.2
Ground chuck	44	36.1	51	41.8	48	39.3	49	40.2
Ground round	49	40.2	20	16.4	45	36.9	22	18.0
Combination of ground beef and ground chuck	2	1.6	2	1.6	1	0.8	2	1.6
Combination of ground chuck and ground round	1	0.8	1	0.8	0	0.0	0	0.0

of "ground beef" and "ground chuck" was the main reason given for their purchase even though "ground round" was preferred.

More than half of the respondents preferred and also bought "ground round" and "ground chuck." "Better flavor" and "less fat" were reasons given for these preferences. Consumers consistently purchased "ground round" and "ground chuck" because they could be assured of more uniformity than if they purchased "ground beef."

Planning Ahead

The majority of the homemakers did not have a specific use planned for the ground beef at the time of purchase. Most bought one kind of ground beef consistently regardless of the dish to be prepared. Many homemakers purchased several packages at one time and stored them in their freezers. However, as the homemakers did not have a specific use planned for the ground beef, it is probable that the most expensive form of ground beef was often being used where a cheaper form might be just as suitable.

Analyzing Ground Beef from Selected Stores

In order to evaluate the composition of ground beef sold in Baton Rouge, samples labeled "ground beef" or "hamburger" and "ground chuck" were purchased from eight stores from all sections of the city. These stores were representative of those where the respondents shopped. The samples were analyzed for moisture, fat, protein, and ash. The chemical analysis showed a wide range of fat content: "ground beef" or "hamburger" varied from 14.5 percent to 35.5 percent, and "ground chuck," from 7.6 percent to 24.8 percent fat. The meat market managers were interviewed for their estimate of the amount of fat in their ground beef. The managers claimed from 20 to 30 percent fat for the "ground beef" and from zero to about 10 percent fat for "ground chuck." Only one said his ground beef was chemically analyzed periodically.

Few food stores at present are using objective methods to ascertain the lean-fat composition of ground beef. Objective methods would be required if they are to fabricate ground beef of uniform quality.

Consumer Evaluation of Ground Beef

Average Panel Ratings for Three Fat Levels

Respondents in this study consistently preferred ground beef with the lowest fat content. Of the three fat levels tested, 15 percent ground beef was rated best, followed in order by 25 percent and 35 percent fat levels (Table 7). For all characteristics except *juiciness*, the dif-

TABLE 7.—Mean Hedonic Ratings of Ground Beef of Three Fat Levels*

Fat content	Color before cooking	Shrinkage	General cooking qualities	Juiciness	Flavor	General rating
15% Patties	2.9	2.5	2.8	3.9	3.0	3.3
25% Patties	3.8	3.5	3.4	3.9	3.4	3.7
35% Patties	4.4	5.5	4.3	4.0	3.7	4.3
15% Bulk	2.5	2.7	2.5	2.8	2.5	2.7
25% Bulk	3.5	3.8	3.4	3.2	2.9	3.4
35% Bulk	3.7	4.9	3.8	3.6	3.2	4.0
15% (Overall)	2.7	2.6	2.6	3.3	2.7	3.0
25% (Overall)	3.6	3.6	3.4	3.5	3.1	3.5
35% (Overall)	4.1	5.2	4.0	3.8	3.5	4.1

1.0 = Highest possible rating.

*To facilitate analysis of variance by the computer, only those families with complete returns were used in this analysis (110 families). Where more than one answer for each type was given, one was randomly chosen.

ferences among fat levels were highly significant ($P < .01$).^{*} Although the ratings decreased as the fat content increased for all of the characteristics rated, respondents were more critical of factors associated with the appearance of the meat prior to cooking and with the cooking qualities (*shrinkage*, *color before cooking*, *general cooking qualities*, and *general liking*). They were less discriminating in rating eating characteristics (*flavor* and *juiciness*) of the meat.

Bulk Versus Patties

With two exceptions (15 percent and 25 percent *shrinkage*), the bulk form of ground beef was rated slightly higher than the patty form. The differences between bulk form and patty form were highly significant ($P < .01$) for all characteristics except *shrinkage* and *general cooking qualities*. The greatest difference between bulk and patty forms was found in ratings of *juiciness*. Bulk form was rated much higher than the patty form for this characteristic. This may have been due to a loss of juice in the compressing of the beef to make the patties.

^{*}Significance was determined by analysis of variance at the 99 percent level (or .01 level of probability), which means that the rating differences could have occurred by chance 1 out of 100 times.

Relationship of Method of Preparation to Average Panel Ratings

The method of preparation had little effect on the average ratings for the different fat levels of ground beef. The lowest fat level was rated best for all methods of preparation, whether fat was incorporated into the dish, as in the bulk form, or drained off, as in the patty form. This indicates that consumers probably would always buy ground beef of the same fat content regardless of its use.

Other Reactions

The rating sheets included space for comments for each characteristic rated. Generally, as the percentage of fat increased, there were fewer favorable comments and more unfavorable comments. The major exception to this was in the comments on *juiciness* of the patties. Unfavorable comments on the lack of juiciness were given for all fat levels of patties. Apparently, the patties lost some of their juiciness when they were compressed. The bulk form received more favorable comments for all characteristics and all fat levels than did the patty form. Comments on fat content appeared in connection with all of the characteristics rated. Most of these expressed dissatisfaction with the amount of fat. Thus, degree of leanness is an important criterion used in rating ground beef.

Influence of Family Characteristics on Average Panel Ratings

The mean (or average) hedonic ratings for each fat level and each form (bulk and patties) were correlated with some of the family characteristics to determine their effect on the acceptability ratings (Appendix Tables 1 through 5).

Family Income

In previous consumer panel work, low income respondents have tended to be less critical of test foods than have high income respondents. In this study of acceptability of different fat levels in ground beef, the above tendency was observed only in rating the 35 percent fat level (Appendix Table 1). The lowest income group gave higher acceptance ratings for the 35 percent fat levels than the other income groups and made little distinction among the three fat levels. This was generally true for all of the characteristics rated. No definite patterns were observed in the ratings of the ground beef with 15 percent and 25 percent fat levels.

The above results imply that income level has little effect on the acceptability of ground beef with a relatively low fat level. However, as the amount of fat is increased, high income groups tend to be more critical of a high fat level than do low income groups. This may be because the low income groups generally are accustomed to using ground beef with high fat content.

Education

The relationship of education of respondents to the average panel ratings was similar to that found between income and ratings (Appendix Tables 2 and 3). This was expected because of the usual close relationship between education and income. Generally, less distinction was made between the lowest and highest fat levels by respondents with less education compared with those with more education. Once again, the greatest difference among educational levels was in the rating of the 35 percent ground beef.

Occupation

The occupational status of respondents had little influence on the acceptability ratings. This was expected, as each occupational category represented a wide range of incomes and ages.

Age

Because of the present emphasis on the relationship of dietary fats to coronary heart disease and to general nutritional status, attempts to reduce or limit fat intake are being made by many people. Older people, in particular, are often advised to limit their consumption of food fats. It was expected that the older group (50 years or older) would be more critical of high fat ground beef than the younger groups. However, the opposite was true (Appendix Tables 4 and 5). That is, the younger age groups were more critical of a high fat level than was the oldest age group, which made little distinction between fat levels. The indication is that the older age group either did not recognize the high fat content of some of the ground beef or did not object to it if they did recognize it.

Summary and Conclusions

One hundred and twenty-two families in Baton Rouge, Louisiana, rated ground beef of three fat levels and in two forms. The families consistently preferred the lowest fat level (15 percent) for all of the six characteristics rated. The differences among the fat levels were highly significant ($P < .01$) for all characteristics except *juiciness*. Respondents were especially critical of the pre-cooked appearance and cooking qualities of the ground beef. There was little variation in ratings of the eating qualities among the three fat levels tested.

The bulk form was favored slightly over the patty form for each level of fat tested. This was especially true of the ratings of *juiciness*. The differences were highly significant ($P < .01$) for all characteristics except *shrinkage* and *general cooking qualities*. There was no distinguishable effect of the method of preparation of the meat on acceptability ratings.

The lowest income families were less critical in their ratings. They made less distinction between the lowest and highest fat levels than respondents with higher income. High income families were especially

critical of the 35 percent fat ground beef. As expected, a similar relationship between average ratings and educational level was observed.

During preliminary interviews, the majority of the respondents stated they usually bought "ground round" or "ground chuck" instead of "ground beef" or "hamburger" because they wanted less fat and could be assured of more consistent quality. When samples of ground beef from eight food stores in Baton Rouge were analyzed, it was found that the fat content of the ground beef did vary widely. Few stores regularly determine lean-fat ratios of ground beef by objective methods, and thus, fat content would naturally vary. If, as respondents in this study stated, consumers look for low fat and consistent quality in ground beef, it would be necessary for retailers to use more objective methods of determining lean-fat ratios.

This study indicates that consumers prefer ground beef with a low fat content. Consumers associate leanness with quality. Although the 15 percent fat level was preferred in this study, it was not ascertained how much more consumers would be willing to pay for the low fat ground beef compared with what they would pay for high fat ground beef. This may depend somewhat on the income, education, age, and occupational status of the consumer.

By knowing his customers, a retailer can supply the type of ground beef which most of them prefer. For example, in a high income area, the consumer will probably not be satisfied with a high fat ground beef. The retailer also must be able to supply the preferred type consistently. By offering what the customer wants, he can better satisfy his customers and increase sales.

Appendix A

Interview Schedule II

Record Number_____

Code Letter _____

Family Name _____

Date Eaten _____
(month) (day) (year)

Which way did you prepare this package of meat? Check one.

A. If in patty form:

(1) _____pan-broiled

(3) _____oven-broiled

(2) _____charcoal-broiled

4) _____pan-fried

B. If in bulk form:

_____meat loaf

_____spaghetti sauce

_____meat balls

_____casserole

_____chili

_____pizza

other _____ (specify)

1. How do you rate the COLOR of this meat before it is cooked?

Excellent ☐

[illegible]Poor ☐

2. After cooking, how do you rate the amount of SHRINKAGE?

Acceptable amount of shrinkage ☐

□ □ □ □ □ □ □ □ □

Too much shrinkage ☐

Comments:_____

Comments: _____

(Continued)

3. How do you rate the GENERAL COOKING QUALITIES of this meat?

Excellent ☐

☐

☐

☐

☐

☐

☐

☐

Poor ☐

Comments: _____

4. After eating the meat, how do you rate its JUICINESS?

Excellent ☐

☐

☐

☐

☐

☐

☐

☐

Poor ☐

Comments: _____

5. How do you rate the FLAVOR OR TASTE of this meat?

Excellent ☐

☐

☐

☐

☐

☐

☐

☐

Poor ☐

Comments: _____

6. IN GENERAL, how do you rate this package of meat?

Excellent ☐

☐

☐

☐

☐

☐

☐

☐

Poor ☐

Comments: _____

BE SURE TO MAIL THESE TWO SHEETS IN THE ENCLOSED ADDRESSED ENVELOPE AS SOON AS POSSIBLE

APPENDIX TABLE 1.—Influence of Income on Average Ratings of Ground Beef

	Color before cooking			Shrinkage			General cooking qualities			Juiciness			Flavor			General acceptability		
	Patties		Bulk	Patties		Bulk	Patties		Bulk	Patties		Bulk	Patties		Bulk	Patties		Bulk
15 Percent fat level																		
Under \$5,000	2.80	2.82		2.77	3.20		2.70	2.69		3.30	2.64		2.91	2.78		3.02	2.98	
\$5,000 to \$10,000	2.77	2.45		2.46	2.58		2.81	2.48		3.55	2.64		2.71	2.29		3.05	2.50	
\$10,000 or more	3.10	2.50		2.50	2.22		3.12	2.53		4.59	3.02		3.86	2.64		4.04	2.80	
25 Percent fat level																		
Under \$5,000	3.36	3.23		3.60	3.13		3.29	2.87		3.33	3.00		3.11	2.60		3.50	2.85	
\$5,000 to \$10,000	3.92	3.41		3.90	3.61		3.67	3.53		4.14	3.24		3.44	2.87		3.90	3.41	
\$10,000 or more	3.55	3.23		3.30	3.70		3.40	3.21		3.77	3.28		3.51	3.10		3.53	3.34	
35 Percent fat level																		
Under \$5,000	3.85	3.45		4.80	4.35		3.85	3.38		3.96	3.36		3.22	2.59		3.98	3.28	
\$5,000 to \$10,000	4.57	4.12		5.62	4.84		4.57	4.01		4.22	3.60		4.02	3.51		4.68	4.19	
\$10,000 or more	4.24	4.20		5.34	5.54		4.38	4.46		4.50	4.28		3.96	3.88		4.53	4.61	

1.00 = Highest possible rating.

APPENDIX TABLE 2.—Influence of Education of Homemaker on Average Ratings of Ground Beef

	Color before cooking			Shrinkage			General cooking qualities			Juiciness			Flavor			General acceptability		
	Patties		Bulk	Patties		Bulk	Patties		Bulk	Patties		Bulk	Patties		Bulk	Patties		Bulk
15 Percent fat level																		
Grade sch., no formal ed.	1.75	3.15		2.33	3.31		2.17	2.92		2.50	2.38		2.25	2.62		2.08	2.92	
High school, trade school	2.86	2.44		2.59	2.70		2.81	2.61		3.42	2.81		2.81	2.44		3.14	2.67	
College	2.92	2.61		2.49	2.41		3.05	2.93		4.44	2.70		3.51	2.55		3.71	2.67	
25 Percent fat level																		
Grade sch., no formal ed.	3.18	1.75		3.55	1.63		2.73	2.13		2.55	1.50		2.91	1.63		3.09	1.75	
High school, trade school	3.50	3.26		3.64	3.40		3.31	3.26		3.90	3.34		3.22	2.90		3.58	3.26	
College	4.06	3.57		3.90	3.91		3.92	3.49		4.01	3.19		3.66	2.96		3.99	3.45	
35 Percent fat level																		
Grade sch., no formal ed.	2.08	2.60		4.00	2.80		2.00	1.80		2.46	1.70		2.15	1.80		1.54	2.00	
High school, trade school	4.17	3.69		5.27	4.44		4.29	3.79		4.10	3.55		3.73	3.25		4.29	3.87	
College	4.86	4.57		5.69	5.78		4.80	4.56		4.67	4.21		4.19	3.84		5.04	4.69	

1.00 = Highest possible rating.

APPENDIX TABLE 3.—Influence of Education of Husband on Average Ratings of Ground Beef

	Color before cooking		Shrinkage		General cooking qualities		Juiciness		Flavor		General acceptability	
	Patties	Bulk	Patties	Bulk	Patties	Bulk	Patties	Bulk	Patties	Bulk	Patties	Bulk
15 Percent fat level												
Grade school	1.88	2.65	2.00	3.06	1.88	2.53	2.31	2.29	1.94	2.35	1.94	2.59
High school, trade school	2.94	2.79	2.65	2.89	3.09	2.74	3.65	2.97	3.01	2.58	3.38	2.85
College	2.83	2.37	2.55	2.37	2.87	2.44	4.12	2.69	3.23	2.46	3.45	2.59
25 Percent fat level												
Grade school	2.67	2.00	2.93	1.83	2.47	2.25	2.07	2.33	2.40	1.58	2.53	1.67
High school, trade school	4.08	3.76	4.12	3.52	3.71	3.58	4.26	3.67	3.55	3.40	4.03	3.70
College	3.67	3.25	3.55	3.75	3.59	3.29	3.97	3.05	3.46	2.74	3.73	3.21
35 Percent fat level												
Grade school	2.75	2.53	4.20	3.00	2.85	2.12	3.25	2.24	2.60	1.88	3.00	2.12
High school, trade school	4.46	4.06	5.62	4.88	4.75	3.80	4.30	3.68	4.25	3.40	4.75	4.06
College	4.57	4.31	5.45	5.27	4.54	4.50	4.46	3.99	3.89	3.71	4.62	4.49

1.00 = Highest possible rating.

APPENDIX TABLE 4.—Influence of Age of Homemaker on Average Ratings of Ground Beef

	Color before cooking		Shrinkage		General cooking qualities		Juiciness		Flavor		General acceptability	
	Patties	Bulk	Patties	Bulk	Patties	Bulk	Patties	Bulk	Patties	Bulk	Patties	Bulk
15 Percent fat level												
Under 30 years	2.81	2.28	2.67	2.47	2.84	2.28	3.83	2.54	2.95	2.23	3.38	2.57
30 to 50 years	2.83	2.62	2.48	2.64	2.94	2.66	3.86	2.88	3.18	2.64	3.39	2.74
50 years or older	2.70	2.55	2.50	2.84	2.63	2.65	3.20	2.61	2.73	2.58	2.77	2.74
25 Percent fat level												
Under 30 years	3.96	3.71	3.61	3.33	3.53	3.24	4.05	3.19	3.21	2.64	3.72	3.20
30 to 50 years	3.75	3.34	3.77	3.75	3.66	3.44	4.01	3.24	3.62	3.08	3.85	3.44
50 years or older	3.03	2.48	3.53	3.07	3.00	2.93	3.00	3.07	2.83	2.52	3.21	2.74
35 Percent fat level												
Under 30 years	4.86	4.56	5.24	4.91	4.47	4.31	3.98	3.88	3.74	3.56	4.57	4.28
30 to 50 years	4.41	4.00	5.67	5.15	4.70	4.17	4.59	3.88	4.22	3.58	4.79	4.34
50 years or older	3.00	2.93	4.48	4.00	2.90	2.79	3.42	2.82	2.55	2.54	3.20	2.93

1.00 = Highest possible rating.

APPENDIX TABLE 5.—Influence of Age of Husband on Average Ratings of Ground Beef

	Color before cooking			Shrinkage			General cooking qualities			Juiciness			Flavor			General acceptability		
	Patties	Bulk		Patties	Bulk		Patties	Bulk		Patties	Bulk		Patties	Bulk		Patties	Bulk	
15 Percent fat level																		
Under 30 years	3.02	2.38		2.95	2.65		3.10	2.43		3.98	2.68		3.21	2.40		3.48	2.75	
30 to 50 years	2.74	2.48		2.39	2.44		2.85	2.49		3.91	2.78		3.10	2.47		3.37	2.56	
50 years or older	2.63	2.97		2.53	3.16		2.60	2.94		3.07	2.74		2.57	2.68		2.77	3.00	
25 Percent fat level																		
Under 30 years	3.97	3.82		3.59	3.67		3.77	3.36		4.46	3.30		3.38	2.85		3.92	3.41	
30 to 50 years	3.78	3.28		3.82	3.51		3.57	3.25		3.95	3.14		3.50	2.90		3.78	3.23	
50 years or older	3.23	2.96		3.40	3.52		3.17	3.44		3.10	3.44		3.07	2.93		3.31	3.30	
35 Percent fat level																		
Under 30 years	4.83	4.35		5.38	5.08		4.63	4.35		4.48	4.06		4.13	3.67		4.75	4.17	
30 to 50 years	4.53	4.19		5.54	5.04		4.65	4.20		4.38	3.86		4.01	3.55		4.69	4.36	
50 years or older	3.00	3.11		3.29	4.21		3.35	2.86		3.61	2.68		3.03	2.64		3.33	3.04	

1.00 = Highest possible rating.

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